

REMARKS/ARGUMENTS

Claims 1, 26, and 35 have been amended to further clarify the invention. Specifically, Claims 1 and 26 have been amended to recite that the partially bleached pulp is “pre-hydrolyzed”. Support for this amendment can be found throughout the specification, for example, at page 20, first paragraph. Claim 35 has been amended to recite that the pulp is at least partially bleached “using a conventional pulp bleaching process”. Claim 25 has also been amended to recite that the pulp is at least partially bleached “using a conventional pulp bleaching process”. Support for these amendments can be found throughout the specification, for example, at page 20, first paragraph. Claims 5 and 38 have been amended to replace the term “as” with “an”, as suggested by the Examiner. As discussed in greater detail below, Claims 31, 35, 43, and 44 have also been amended. New Claim 47 has been added and recites that the temperature of the caustic solution is less than 50° C. Support for this amendment can be found, for example, at page 9, lines 15 -21. New Claim 48 is directed to a process of preparing a high purity xylose product in the absence of an additional purification step. Support for this amendment can be found, for example, at page 3 line 28 – page 4, line 2.

The Examiner has indicated that the Information Disclosure Statement filed March 11, 2004 failed to comply with CFR 1.98(a)(2) because a legible copy of each cited foreign patent document was not included. In response, Applicants have submitted a Supplemental Information Disclosure Statement which includes a legible copy of the document in question.

Rejections Under 35 U.S.C. § 112

Claims 16, 31, and 35 – 46 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. In response, Applicants have amended the claims to overcome this rejection. Specifically, Applicants have made the following amendments: Claim 16 has been amended to replace the term “hydrolyzing step” with the term “acid hydrolyzing step”; Claim 31 has been amended to recite that the molecular weight is in Daltons; Claim 35 has been amended to delete the term “high-purity” in the preamble; Claim 43 has been amended to depend on Claim 35 and to recite that the concentrated hemicellulose is acidified prior to the hydrolyzing step; and Claim

44 has been amended to replace the term “acidifying step” with the term “acid hydrolyzing step”. In view of these amendments, Applicants respectfully submit that the rejections under 35 U.S.C. § 112, second paragraph, have been overcome.

Rejections Under 35 U.S.C. § 102 and 103

Claims 1 and 2 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,512,110 to Heikkila et al. Claims 1 – 46 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Heikkila.

Heikkila describes a process for the production of xylose from a paper-grade kraft hardwood pulp. The process includes treating the pulp with a xylanase enzyme treatment. The Examiner alleges that the xylanase treatment is equivalent to bleaching the pulp. However, the xylanase treatment used by Heikkila does not actually bleach the pulp. The function of the xylanase treatment is to break down the xylan molecules, or reduce the xylan size, so that the xylan in the pulp fibers can be dissolved or extracted more easily into caustic solution. This cannot be considered equivalent to bleaching.

Independent Claims 1, 26, and 35 recite that the wood pulp is at least partially bleached. Contrary, to the Examiner’s assertion, bleaching of the wood pulp is not disclosed or suggested by Heikkila. As noted above, the xylanase treatment cannot be considered a bleaching process. Further, Heikkila repeatedly distinguishes its xylanase treatment from bleaching processes, and the problems associated with such bleaching. For example, Heikkila states at column 2, lines 35 – 49 that the chemicals used in pulp bleaching “attacks the cellulose itself, with resulting decreases in degree of polymerization and pulp yield. The low molecular weight of some of the hemicellulose fragments makes them hard to isolate, while in some cases (prehydrolysis kraft), the harsh conditions convert the hemicelluloses to decomposition products.” Thus, Heikkila specifically distinguishes its xylanase treatment from conventional bleaching processes. Therefore, Claims 1 and 2 are not anticipated by the cited reference.

To further clarify the invention, Claims 1 and 26 have been amended to recite that the partially bleached pulp is pre-hydrolyzed. This is not disclosed or suggested in the cited reference. In contrast, the starting material described in Heikkila is a paper-grade kraft pulp

without a pre-hydrolysis treatment. It is generally known that to make paper-grade pulp, the wood chips are not pre-hydrolyzed. When wood chips are pre-hydrolyzed before kraft cooking, the resulting pulp, also known as “dissolving pulp” cannot be used for paper making. Thus, a pre-hydrolyzed pulp is not the same as paper-grade pulp. In this regard, Applicants have provided an excerpt from the textbook: 2nd Edition, *Handbook for Pulp & Paper Technologists*, G.A. Smook, Angus Wilde Publications 1999, pp 77 – 79. The excerpt on page 79 states that a prehydrolysis step, in contrast to the regular papermaking process, can be used in the kraft process to produce a dissolving grade pulp. Thus, Heikkila fails to disclose or suggest the step of providing a pre-hydrolyzed pulp.

Further, Heikkila repeatedly teaches away from using a pre-hydrolyzed pulp. For example, the excerpt from Heikkila quoted above states that “the harsh conditions [of prehydrolysis kraft] convert the hemicelluloses to decomposition products. Heikkila also states that the use of dissolving pulps (e.g., pre-hydrolyzed pulp) requires “more drastic treatment with alkali, with resulting decrease in pulp yield. Since the hemicelluloses removed normally are not recovered from such treatments, they are used, if at all, as fuel and have negligible value.” See column 3, lines 3 – 7. Thus, Heikkila clearly teaches that its pulp is not pre-hydrolyzed. Therefore, Claims 1, 26 and any claims dependent thereon are patentable over the cited reference.

Independent Claim 35 has been amended to recite that the pulp is at least partially bleached using conventional bleaching processes. As discussed above, Heikkila repeatedly distinguishes the xylanase treatment of the pulp from bleaching processes. Thus, Heikkila fails to disclose or suggest the claimed invention. Therefore, Claim 35 and any claims dependent thereon are also patentable over the cited reference.

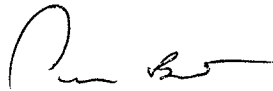
In view of the foregoing amendments and remarks, it is respectfully submitted that the rejections under 112, 102, and 103 have been overcome. Because the cited reference does not disclose or suggest each and every element recited in the claims as amended, the claimed invention is patentable over the cited reference and the pending rejections under 35 U.S.C. § 102 and 103 should be withdrawn.

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Conclusion

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



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